URS

Particulate Matter Less Than Ten Microns
Air Quality Monitoring
Siting Study Report

Prepared for:

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1.0 Introduction

This document presents the results of a particulate matter less than 10 microns (PM_{10}) air quality monitor site selection study conducted at KCBX Terminal Company's (KCBX) North and South Terminal Facilities by URS Corporation. Jim Clarke and Greg Mazik from URS are the consultants responsible for the siting survey, which was conducted employing the guidance of 40CFR Part 58, Appendix E and related agency documents. The North Terminal is located at 3259 East 100th Street and the South Terminal at 10740 South Burley Avenue, in Chicago, Illinois. These terminals stage and handle bulk materials which are loaded on vessels, barges, trucks, and railcars for shipment to customers.

1.1 Study Background and Objective

On November 15, 2013, the United States Environmental Protection Agency (USEPA) issued a Request for Information (RFI) under Section 114(a) of the Clean Air Act. The RFI requires KCBX to install and operate PM_{10} air quality monitors and samplers at its South and North Terminals for a period of one year. The objective of this request is to demonstrate that operations at both terminals are meeting the National Ambient Air Quality Standards (NAAQS) for PM_{10}. The current NAAQS for PM_{10} is 150 $\mu g/m^3$ for a 24-hour average, not to be exceeded more than once per year on average over three years.

In addition, the request requires a 10-meter meteorological station be operated at one of the sites to characterize wind flow through the area during the study period. KCBX has elected to install two identical meteorological monitoring stations, one at the North Terminal NW site and one along the east fence line of the South Terminal. The meteorological monitors will meet the specifications of USEPA meteorological monitoring guidance in Volume IV of the Quality Assurance Handbook and be of sufficient quality for low threshold wind measurements to use in modeling applications if needed.

1.2 Required PM_{10} Monitor and Sampler Locations

The RFI specifies that KCBX install and operate three Federal Equivalent Method (FEM) real-time PM_{10} monitors at each terminal for a period of one year. At the South Terminal, monitors need to be placed near the property line to the northeast, southwest, and center east. Real-time monitors at the North Terminal will be located near the northeast, southwest, and northwest property lines. In addition, each terminal is required to operate a Federal Reference Method (FRM) filter-based PM_{10} sampler at its northeast monitoring site.

1.3 Supplemental PM_{10} Monitor Locations

KCBX has elected to voluntarily install additional FEM PM_{10} monitors at each terminal. Two more monitor locations were identified along the north and northwest property lines at the

South Terminal. One additional monitoring location at the North Terminal was identified in the southeast corner of the property. These additional monitors will provide supplemental data for evaluating PM_{10} levels at or near the KCBX terminals.

1.4 PM_{10} Sample Speciation

The RFI included a requirement to archive filter media from the FRM samplers for two years, presumably for subsequent speciation analyses. KCBX will produce a target list of analytes and provide that list in its Quality Assurance Project Plan developed for the monitoring network. Speciation analyses to be performed on the FRM filter samples that will be obtained every three days from each terminal's northeast monitoring site. The species selected will drive the choice of sample media used for the study. Since metals and ions are best suited for Teflon media, and quartz fiber media are best for organic and elemental carbon, a second FRM sampler will need to be deployed at these sites to cover both media types to allow for sufficient variety of analytical techniques.

2.0 Site Selection

The PM_{10} air quality monitor and sampler location selection criteria were based on 40CFR, Part 58, Appendix E, and summarized in U.S. EPA's "Ambient Monitoring Guidelines for Prevention of Significant Deterioration." The following list presents the main objectives for locating a PM_{10} air quality monitor or sampler.

- The monitor/sampler inlet should be placed near breathing height;
- An unrestricted air flow in an arc of at least 270° around the inlet is recommended;
- If the sample inlet is placed on a roof, it should be placed at least 2 meters from any other structure;
- The inlet should be at least one meter above any supporting structures;
- If the inlet is to be located between two obstacles, it should be at least 2 times the height that the obstacle protrudes above the sampler away from the obstacle; and
- The monitor/sampler inlet should be at least 20 meters from the drip line of trees in the area, and must be at least 10 meters from the drip line of trees when they act as an obstruction.

In addition, the meteorological stations were located with guidance provided in Volume IV of USEPA's Quality Assurance Handbook and the document "Meteorological Monitoring Guidance for Regulatory Modeling Applications". This document makes the following recommendations for specific meteorological parameters:

2.1 Wind Speed and Wind Direction

- Sensors should be located at the 10-meter level;
- Distance from obstructions to sensors should be at least 10 times the height of the obstruction;
- Wind instruments mounted on a boom should be twice the width of the tower away from the tower; and
- The boom should be at a right angle to the prevailing wind direction.

2.2 Temperature

- Sensor(s) located in an open and level area 9 meters in diameter;
- Surface below the sensor(s) should be covered by short grass;
- Sensor(s) should be protected from thermal radiation;

- Distance from sensor(s) to obstruction at least four times the height of the obstruction;
- Should be located at least 30 meters from large paved areas; and
- Low areas that hold standing water after rains should be avoided.

In addition to the guidance provided above, access to electrical power and security of the instrumentation were taken into account in choosing sites. Given the urban locations of the terminals, locating the meteorological stations at least ten times the height away from every possible obstruction was not possible.

3.0 Proposed Locations

The proposed PM_{10} monitor/sampler and meteorological station locations at the South and North Terminals are presented in Figures 1 and 2, respectively. The supplemental locations are shown on the maps in Figures 1 and 2 with "KCBX" in the legend. The blue lines on each figure denote the approximate property line boundaries.

Physical access, lack of electrical power or other considerations may prevent the utilization of the proposed sites. For example, the North Plant's northwest monitoring site location was selected because of physical challenges at the site and to best isolate PM contribution, if any, from other possible PM sources. KCBX leases this property and may need to obtain permission from the owner and attempt to negotiate an agreement. An alternate site – subject to EPA's approval – may need to be selected if it cannot reach an agreement with the property owner.

The following paragraphs discuss each of the PM_{10} and meteorological monitoring sites proposed in this document including, general site conditions, GPS coordinates, and security concerns. Photographs showing the view from each of the required locations to the north, east, south, and west are included in Appendix A for the South Terminal and Appendix B for the North Terminal.

3.1 South Terminal – Center East Monitor

The Center East site is located just west of the property line in between a berm and a road used by haul trucks. The berm extends from the south to northwest sectors. Residential housing is located to the east.

GPS Coordinates:	41 41.673 N 87 32.756 W
Security:	Located within the fenced property line.

3.2 South Terminal – Southwest Monitor

This site is situated near the southwest corner of the South Terminal property. The Calumet River is directly to the west, covering the south through north sectors. KCBX property occupies the north-northwest to east sectors. Other industry is located from the east to the south.

GPS Coordinates:	41 41.608 N 87 33.070 W
Security:	Located within the fenced property line.

Figure 1. Location of South Terminal Monitoring Sites

Blue line is approximate KCBX property boundary

Figure 2. Location of North Terminal Monitoring Sites

Blue line is approximate KCBX property boundary

3.3 South Terminal – Northeast Monitor/Samplers

The northeast site is proposed near the northeast corner of the property, just south of the main office building. This site would include the FRM PM_{10} samplers in addition to the FEM continuous monitor. Residential housing can be found from the north to south sectors. KCBX operations are located from the south to northwest. Other industry is located from the northwest to the north.

GPS Coordinates:	41 41.954 N
	87 32.744 W
Security:	Located within the fenced property line.

3.4 South Terminal – North Monitor

The supplemental north site is proposed south of the north property line. Other industry occupies the northwest through northeast sectors, while, KCBX operations are located from the northeast to northwest.

GPS Coordinates:	41 41.921 N
	87 32.864 W
Security:	Located within the fenced property line.

3.5 South Terminal – Northwest Monitor

The supplemental northwest site is proposed in the northwest corner of the property line adjacent to the Calumet River. Other industry occupies the area immediately east, while KCBX operations are located from the south and southeast.

GPS Coordinates:	41 41.936 N
	87 33.066 W
Security:	Located within the fenced property line.

3.6 South Terminal – Meteorological Station

The meteorological station is proposed to be installed along the east property line. This location offers the best option for avoiding potential obstacles to air flow on the property.

GPS Coordinates:	41 41.854 N
	87 32.746 W
Security:	Located within the fenced property line.

3.7 North Terminal – Southwest Monitor

This site would be located near the southwest corner of the North Terminal property. KCBX operations can be found from the north through east sectors. Residential property is located to the west. Other industry occupies property to the southeast.

GPS Coordinates:	41 42.573 N 87 33.013 W
Security:	May need security fencing at this site. The road along the west property line is well travelled. Numerous trucks from various companies were observed passing by.

3.8 North Terminal – Northwest Monitor/Meteorological Station

The proposed northwest monitoring site is located in an open area north of the piles and the truck access road. This location offers the best option for avoiding potential obstacles to air flow on the property. Residential property is found from the southwest through north sectors. The Belt Line Railroad owns the property to the immediate west. Other industry is found to the north. The provision of electrical power is possible and is under further investigation.

GPS Coordinates:	41 42.744 N 87 32.911 W
Security:	Located within the fenced property line.

3.9 North Terminal – Northeast Monitor/Samplers

This site would be located near the northeast corner of the property, south of E. 100th Street and west of the Calumet River. This site would include the FRM PM_{10} samplers in addition to the FEM continuous monitor. KCBX property occupies the south through west sectors. Other industry is found to the north, across 100th Street, and from the north through south sectors.

GPS Coordinates:	41 42.797 N 87 32.952 W
Security:	Located within the fenced property line.

3.10 North Terminal – Southeast Monitor

The entire south property line is on a barge loading slip. Product piles are located very close to the edge of the slip. This location is on the point where the slip empties into the Calumet River. KCBX operations are located from the west to north sectors. Other industry can be found from the east through west sectors.

GPS Coordinates:	41 42.576 N 87 32.708 W
Security:	Located within the fenced property line.

4.0 References

U.S. Environmental Protection Agency, *Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring,* 40 CFR Ch. I, 7-1-12 Edition, Part 58, Appendix E.

U.S. Environmental Protection Agency, March 2008, *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV –Meteorological Measurements Version 2.0"*, EPA-454/B-08-002.

U.S. Environmental Protection Agency, 1987. *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD),* EPA-450/4-87-007.

U.S. Environmental Protection Agency, 2000. *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, EPA-454/R-99-005.

Appendix A

SOUTH TERMINAL
SITE LOCATION PHOTOGRAPHS

NOTE: Photographs were taken during multiple visits to terminal facility, so snow cover may appear different depending on which site is viewed

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE A-1
SITE PHOTOGRAPHS
SOUTH TERMINAL – CENTER EAST MONITOR

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE A-1 (CONCLUDED)
SITE PHOTOGRAPHS
SOUTH TERMINAL – CENTER EAST MONITOR

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE A-2
SITE PHOTOGRAPHS
SOUTH TERMINAL – SOUTHWEST MONITOR

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE A-2 (CONCLUDED)
SITE PHOTOGRAPHS
SOUTH TERMINAL – SOUTHWEST MONITOR

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE A-3
SITE PHOTOGRAPHS
SOUTH TERMINAL – NORTHWEST MONITOR

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE A-3 (CONCLUDED)
SITE PHOTOGRAPHS
SOUTH TERMINAL – NORTHHWEST MONITOR

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE A-4
SITE PHOTOGRAPHS
SOUTH TERMINAL – NORTHEAST MONITORS

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE A-4 (CONCLUDED)
SITE PHOTOGRAPHS
SOUTH TERMINAL – NORTHEAST MONITORS

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE A-5
SITE PHOTOGRAPHS
SOUTH TERMINAL – NORTH MONITOR

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE A-5 (CONCLUDED)
SITE PHOTOGRAPHS
SOUTH TERMINAL – NORTH MONITOR

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE A-6
SITE PHOTOGRAPHS
SOUTH TERMINAL – METEOROLOGICAL STATION

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE A-6 (CONCLUDED)
SITE PHOTOGRAPHS
SOUTH TERMINAL – METEOROLOGICAL STATION

Appendix B

NORTH TERMINAL
SITE LOCATION PHOTOGRAPHS

NOTE: Photographs were taken during multiple visits to terminal facility, so snow cover may appear different depending on which site is viewed

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE B-1
SITE PHOTOGRAPHS
NORTH TERMINAL – SOUTHWEST MONITOR

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE B-1 (CONCLUDED)
SITE PHOTOGRAPHS
NORTH TERMINAL – SOUTHWEST MONITOR

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE B-2
SITE PHOTOGRAPHS
NORTH TERMINAL – NORTHEAST MONITORS

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE B-2 (CONCLUDED)
SITE PHOTOGRAPHS
NORTH TERMINAL – NORTHEAST MONITORS

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE B-3
SITE PHOTOGRAPHS
NORTH TERMINAL – NORTHWEST MONITOR AND METEOROLOGICAL STATION

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE B-3 (CONCLUDED)
SITE PHOTOGRAPHS
NORTH TERMINAL – NORTHWEST MONITOR AND METEOROLOGICAL STATION

VIEW LOOKING NORTH

VIEW LOOKING EAST

FIGURE B-4
SITE PHOTOGRAPHS
NORTH TERMINAL – SOUTHEAST MONITOR

VIEW LOOKING SOUTH

VIEW LOOKING WEST

FIGURE B-4 (CONCLUDED)
SITE PHOTOGRAPHS
NORTH TERMINAL – SOUTHEAST MONITOR